

users movement of the scrollwheel. This resistance could be accomplished by using an electromechanical device, such as a motor, to resist the motion of the scrollwheel **120**. This resistance could be used to represent any number of data types, including but not limited to data on a web page or the text in an email. “Bump”**202** represents a physical movement of the scrollwheel towards or away from the user which would push the scrollwheel back against the user’s thumb, but would not stop the scrollwheel motion. This motion could be accomplished by using an actuator or an electromechanical device. The “bump” could be used to represent a change in the data, for example a paragraph change on a page of text or in an email or a location where optional data needs to be entered into a data form. Flat line **203** is a “free slide” where the scrollwheel provides no resistance to the user’s actions. The “free slide” could be accomplished by allowing the scrollwheel to roll smoothly. The “free slide” could be used to represent data that does not need close inspection, for example a blank section in a text page or data that the user has already processed. “Hole”**204** represents a temporary physical stopping of the scrollwheel accompanied by movement towards or away from the user. The “hole” could be accomplished using an actuator or electromechanical device to move the scrollwheel towards or away from the user accompanied by a motor or electromechanical braking system to prevent the scrollwheel from moving in a particular direction, while still allowing the scrollwheel to move in the opposite direction. The “hole” could be used to represent any number of important types of data including an important line in an email or text page or the location of a mandatory data item that must be entered on a data form. Once the text has been processed or the data entered the scrollwheel would be released by the software, or in the alternative the scrollwheel could simply be rolled out of the “hole,” the user then being able to continue moving the scrollwheel. Vertical line **205** represents a complete physical stopping of the scrollwheel. This could be accomplished by using a motor or electromechanical braking system to hold the scrollwheel in place. This complete stopping of the scrollwheel could be used to indicate an end to the data being processed, for example the user having reached the end of a text page or email.

**[0023]** As further examples of the system, on-screen situations are described below, where the cursor travel relative to its screen position would result in various types of feedback being provided to the user. The type of feedback provided could be subject to the software programming of the position of the cursor. The type of feedback provided to the user would differ for different cursor positions on the screen. Some of the types of feedback are bumps, holes, plateaus, free slides, resistant surfaces, and abrupt stops as described above.

**[0024]** **FIG. 3** is a diagram showing a screen of a handheld electronic device and illustrating different types of dynamic feedback. The display screen **300** shows a variety of objects, including the current time **302**, the number of unread messages **303**, wireless signal strength **304** and battery level **305**. The display screen also shows icons representing various applications, including an email application icon **310**, a compose message application icon **311**, a search messages icon **312**, a phone application icon **313** and an address book application icon **314**. Various other icons **330** for additional applications are also shown.

**[0025]** The first cursor position **323** indicates that the address book application icon **314** is the current active icon.

**[0026]** In one embodiment of the invention, when the user wishes to move the cursor from its first cursor position **323** to a second cursor position **321** associated with the email application icon **310** in order to select the email application icon **310** for example, the user will roll the scrollwheel in a particular direction as dictated by the device software. Rolling the scrollwheel will cause the cursor to move from the first cursor position **323**, following path **322** to the second cursor position **321**. As this takes place, various types of feedback are provided to the user depending on triggers or messages from application software on the device. The feedback line **320** shown in **FIG. 3** is a graphical representation of several types of triggers that can be associated with the icons displayed on the screen **300**. In the first cursor position **323**, the address book application icon **314** is associated with a hole trigger **324**. In a hole trigger **324**, the scrollwheel would require a change in rotational force to move the cursor from the first current position **323** to the second cursor position **321**. The user would experience a programmed feedback as the cursor moves along from icon to icon along the path **322** until reaching the second cursor position **321**.

**[0027]** **FIG. 4** is a diagram of a screen **400** showing a messaging application. Screen **400** shows a number of objects including the number of unread messages **402** and listing messages received on Friday **410**, including urgent messages **412** and **413**, and messages received on Thursday **420**, including low priority message **421**. The cursor **411** is currently associated with the most recently received message. By rolling the scrollwheel, the position of the cursor **411** can be moved up and down the list along the path **430**. As the cursor **411** highlights a particular message, for example urgent message **412**, a particular type of feedback is activated, for example the scrollwheel could move laterally or “bump” when an urgent message **412** or **413** is highlighted. In a similar manner, when the cursor **411** highlights a regular priority message **414**, a different type of feedback may be activated, such as a smaller “bump” or no bump at all. Similarly, when the cursor **411** highlights the low priority message **421**, a third different type of feedback may be activated.

**[0028]** **FIG. 5** diagram of a data page **500** having different objects that trigger different types of feedback. The data page **500** comprises a number of objects typically found in data pages such as web pages, including a title **510**, an image **520**, an image linking to a web page **521**, a text field **530**, radio buttons **540**, plain text **550**, bold text **560** and an email address **570**. In this example, as the cursor **580** is moved about the page using a scrollwheel, various types of feedback are returned to the user. As an example, starting at the title **510**, a “plateau,” or constant resistance to scrollwheel rotation, may be sent to the scrollwheel, laterally moving the scrollwheel and maintaining its outward position, indicating a starting position. As the cursor **580** is moved through the regular image **520**, no feedback may be given, or a “free slide” may be allowed, where the scrollwheel has no frictional resistance. When the cursor highlights the image with a link to a website **521**, a type of feedback such as a resistance to rotation may be sent to the user to indicate the presence of the link. As the cursor **580** highlights the text field **530**, a “hole” type of feedback may be sent through the